THE CITY OF Kalamazoo

Department of Public Services
Director's Office
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Mr. Michael Berkoff, Remedial Project Manager
Superfund Division
U.S. EPA – Region V
77 West Jackson Blvd.
SR-6j
Chicago, IL 60604

RE: Allied Paper OU-1 Closure Plan
Containment System Option

Dear Mr. Berkoff:

As a follow-up to the brief discussion between you and Rick Burns of NTH at the Kalamazoo River Clean-up Coalition (KRCC) meeting on April 21, 2010, we are providing you an option for the Allied Paper Site (OU-1) closure that includes containment features not proposed in any of the scenarios proposed in the Draft Feasibility Study Report prepared by Arcadis on behalf of facility owner, Lyondell. We believe that this option is technically feasible, more protective of the environment than previous proposals, and can be designed, constructed, and maintained within the budget recently allocated toward closure of OU-1 by federal bankruptcy court.

Our proposal, which includes both horizontal and vertical barriers, is summarized on the attached site plan and associated typical profile. As shown, the primary design features include: a "Part 115" composite cover to prevent infiltration; a 'soil-bentonite cut-off wall to provide horizontal containment and inhibit groundwater flow through the waste; interior drainage to collect contaminated groundwater and create inward gradients; and a leachate pretreatment system. Additional features include a comprehensive groundwater monitoring program, including sentinel wells located between OU-1 and the City's Central Wellfield.

To support and validate our closure concept, our technical consultant, NTH Consultants, Ltd, who has demonstrated and proven experience in landfill design and closure, prepared detailed preliminary estimates for each stage and component of the plan including design, mobilization, construction, and post-closure maintenance and monitoring. These estimates are summarized on the attached spreadsheet tables, which include our assumptions. To provide a familiar basis, NTH used Arcadis estimates for common components (e.g., site preparation, mobilization, and final cover) directly from their draft FS report. NTH also used current construction databases and recent experience to develop estimates for additional components (e.g., cut-off wall, internal drainage, perimeter sewers and groundwater treatment).

Our total estimate for the containment system is approximately $45.8 million, which includes a 10 percent contingency, about $4.2 million. This leaves about $8 million, or 15 percent, of the $54 million budget established for site closure. The balance could be applied toward additional improvements and/or necessary administrative cost associated with plan development and implementation. We believe our estimate is conservative.

We request to meet with you, MDNRE, and your respective technical consultants, CH2M-Hill and CDM, to discuss our proposal in detail and provide insights regarding our design concept assumptions, material quantities/unit costs, and constructability issues. We believe these combined technical resources will validate our closure concept and will likely improve the overall plan with the funds allocated and reserved for this purpose.

We appreciate this opportunity to provide a closure option that dramatically improves the excessively simple "cover and monitor" concepts previously proposed by Lyondell/Arcadis. Please contact me to arrange a meeting at your earliest convenience.

Sincerely,

Bruce E. Merchant
Public Services Director

Attachments:

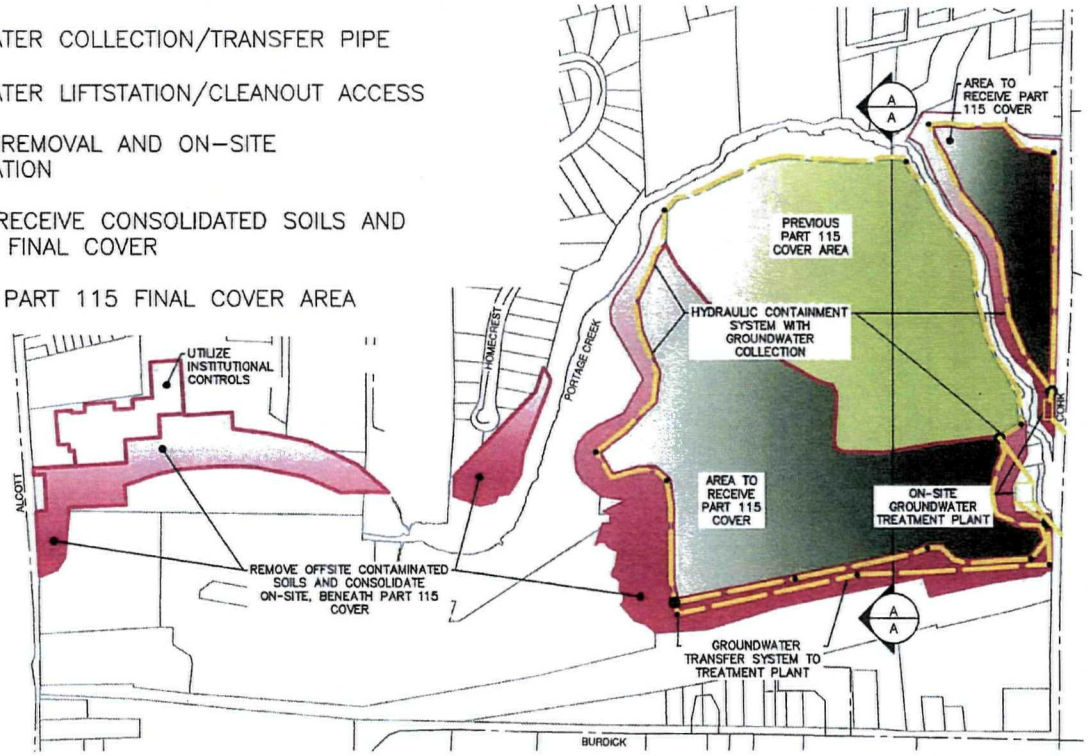
OU-1 Site Plan with Line of Section
Closure Containment System Option – Typical Cross-Section
Cost Estimate Table and Assumptions

c: John P. Paquin, City of Kalamazoo
Rick Burns, NTH
File

ALLIED PAPER (OU-1) CLOSURE
CONTAINMENT SYSTEM OPTION

LEGEND

- GROUNDWATER COLLECTION/TRANSFER PIPE
- GROUNDWATER LIFTSTATION/CLEANOUT ACCESS
- OFF–SITE REMOVAL AND ON–SITE CONSOLIDATION
- AREA TO RECEIVE CONSOLIDATED SOILS AND PART 115 FINAL COVER
- PREVIOUS PART 115 FINAL COVER AREA



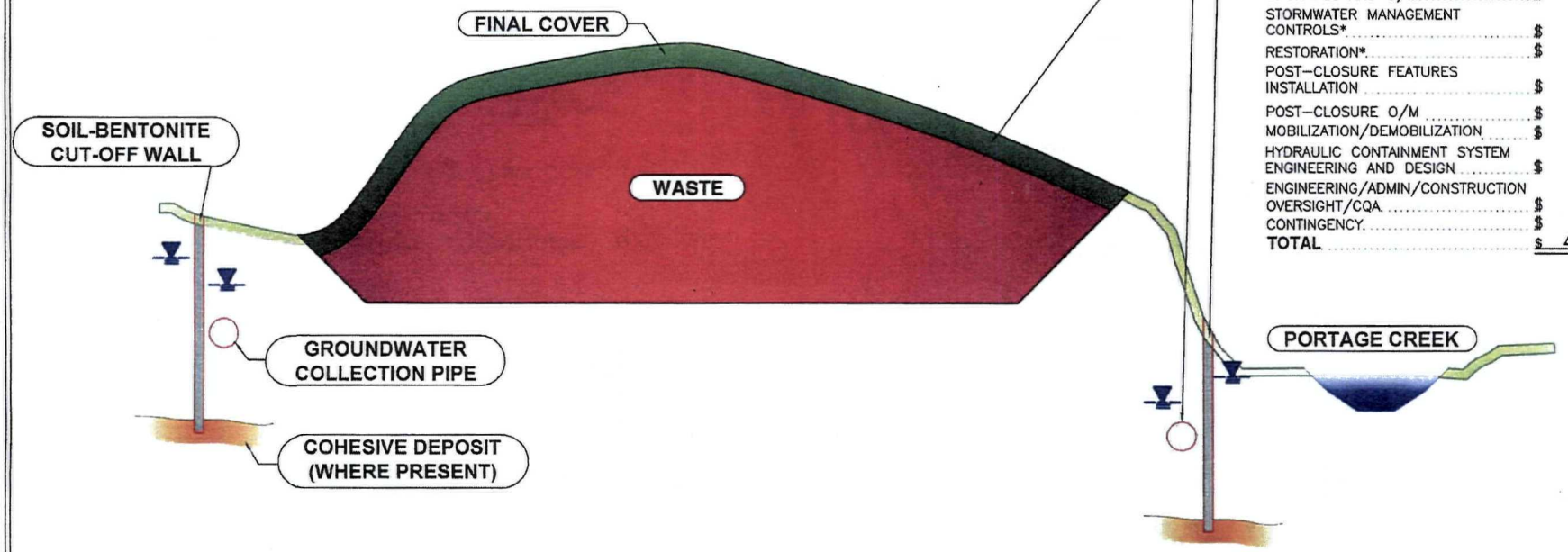
PLAN VIEW

PREPARED BY:

Kalamazoo

NTH Consultants, Ltd.

ALLIED PAPER (OU-1) CLOSURE
CONTAINMENT SYSTEM OPTION



COST ESTIMATE

ITEM	COST
SITE PREPARATION	$ 3,620,000
OFF-SITE WASTE CONSOLIDATION*	$ 3,334,000
PART 115 FINAL COVER	$ 6,110,000
GROUNDWATER COLLECTION SYSTEM	$ 3,750,500
SOIL-BENTONITE CUT-OFF WALL	$ 2,700,000
GROUNDWATER TRANSFER SYSTEM	$ 625,000
GROUNDWATER TREATMENT SYSTEM UPGRADES AND O/M	$ 1,430,750
STORMWATER MANAGEMENT CONTROLS*	$ 1,257,000
RESTORATION*	$ 3,455,000
POST-CLOSURE FEATURES INSTALLATION	$ 1,104,000
POST-CLOSURE O/M	$ 7,500,000
MOBILIZATION/DEMOBILIZATION	$ 2,739,000
HYDRAULIC CONTAINMENT SYSTEM ENGINEERING AND DESIGN	$ 250,000
ENGINEERING/ADMIN/CONSTRUCTION OVERSIGHT/CQA	$ 3,763,000
CONTINGENCY	$ 4,164,000
TOTAL	**$ 45,800,000**

A TYPICAL CROSS-SECTION

PREPARED BY:

NTH Consultants, Ltd.

*COST OBTAINED FROM DRAFT FEASIBILITY STUDY REPORT, PREPARED BY ARCADIS, DATED 10/29/09.

ALLIED PAPER (OU-1) CLOSURE

CONTAINMENT SYSTEM OPTION

	Item	Quantity	Unit	Unit Cost	Extended Cost	Assumptions
1	Site Preparation	1	LS	$ 3,620,000	$ 3,620,000	1
2	Excavation and consolidation of offsite wastes	1	LS	$ 3,334,000	$ 3,334,000	1
3	Final Cover System					
	a. Survey	1	LS	$ 70,000	$ 70,000	1
	b. Grading Layer	1	LS	$ 452,000	$ 452,000	1
	c. Geotextile Separator	1	LS	$ 366,000	$ 366,000	1
	d. Gas Venting Layer	28	ac	$ 48,400	$ 1,355,200	2
	e. Passive Gas Vents	28	ea	$ 1,800	$ 50,400	3
	f. Geomembrane	28	ac	$ 21,800	$ 610,400	4
	h. Geocomposite	28	ac	$ 24,960	$ 698,880	5
	d. Soil Protection Layer	28	ac	$ 65,340	$ 1,829,520	6
	e. Topsoil/Seed/Mulch	28	ac	$ 24,200	$ 677,600	7
4	Soil-Bentonite Cut-Off Wall	450,000	v. sf	$ 6	$ 2,700,000	8
5	Groundwater Collector Pipe	9,000	lf	$ 265	$ 2,385,000	9
6	Groundwater Collector Pipe Backfill	315,000	v. sf	$ 3.70	$ 1,165,500	
7	Groundwater Collector Access C.O.	10	ea	$ 20,000.00	$ 200,000	10
8	Groundwater Transfer Pipe	2,200	lf	$ 100	$ 220,000	11
9	Groundwater Transfer Pipe Connections	15	ea	$ 3,000.00	$ 45,000	
10	Groundwater Transfer Lift Stations	4	ea	$ 90,000	$ 360,000	12
11	Groundwater Treatement System Upgrade/ O&M	1	LS	$ 1,430,750	$ 1,430,750	13
12	Stormwater Management Controls	1	LS	$ 1,257,000	$ 1,257,000	1
13	Restoration	1	LS	$ 3,455,000	$ 3,455,000	1
14	Post Closure Features Installation	1	LS	$ 1,104,000	$ 1,104,000	14
15	Post Closure O & M Cost	1	LS	$ 7,500,000	$ 7,500,000	15
16	Mob/Demob	10	%	-	$ 2,739,000	16
17	Hydraulic Containment System Engineering and Design	1	LS	$ 250,000	$ 250,000	17
18	Engineering/Admin/Construction Oversight and CQA	10	%	-	$ 3,763,000	18
19	Contingency	10	%	-	$ 4,164,000	19
20	**Total Cost**				**$45,802,000**	

THE CITY OF Kalamazoo

NTH Consultants, Ltd.
Infrastructure Engineering and Environmental Services

ALLIED PAPER (OU-1) CLOSURE

CONTAINMENT SYSTEM OPTION

Assumptions

1. From Arcadis Option 3B, Draft Feasibility Study 10/29/09 with increased cost for Hydraulic Containment System Site Prep. Cost based on Experience.

2. Assume Sand Backfill from Offsite, Short Haul (<25 mi). Supply, Place, Compact Cost. Cost Based on Past Experience. 28 ac provided by ARCADIS FS Analysis 10/29/09

3. Assume Drill & Backfill, install 6" HDPE Perf/Solid, Screen/Turbine, 5 lf/well, 1/acre. Supply and Install Cost. Cost Based on Past Experience
4. Cost Based on Past Experience. Supply and Place Textured HDPE Geomembrane
5. Cost Based on Past Experience. Supply and Place 200-mil double sided geocomposite
6. 2' Sand Backfill from Offsite, Short Haul (<25 mi). Supply, Place, Compact Cost.Cost Based on Past Experience
7. Assume 4-6" topsoil. Supply and Place Cost. Cost Based on OHM Engineering Bid Tab
8. Assume One-Pass Trench Installation Method, 2 ft wide, Max. 50' depth. Supply & Place Cost Cost Based on Past Experience + Inflation
9. Assume One-Pass Trench Installation Method, Max. 35' depth. Supply & Place 6" HDPE, with Peastone Backfill to Grade. Cost Based on Past Experience + Inflation

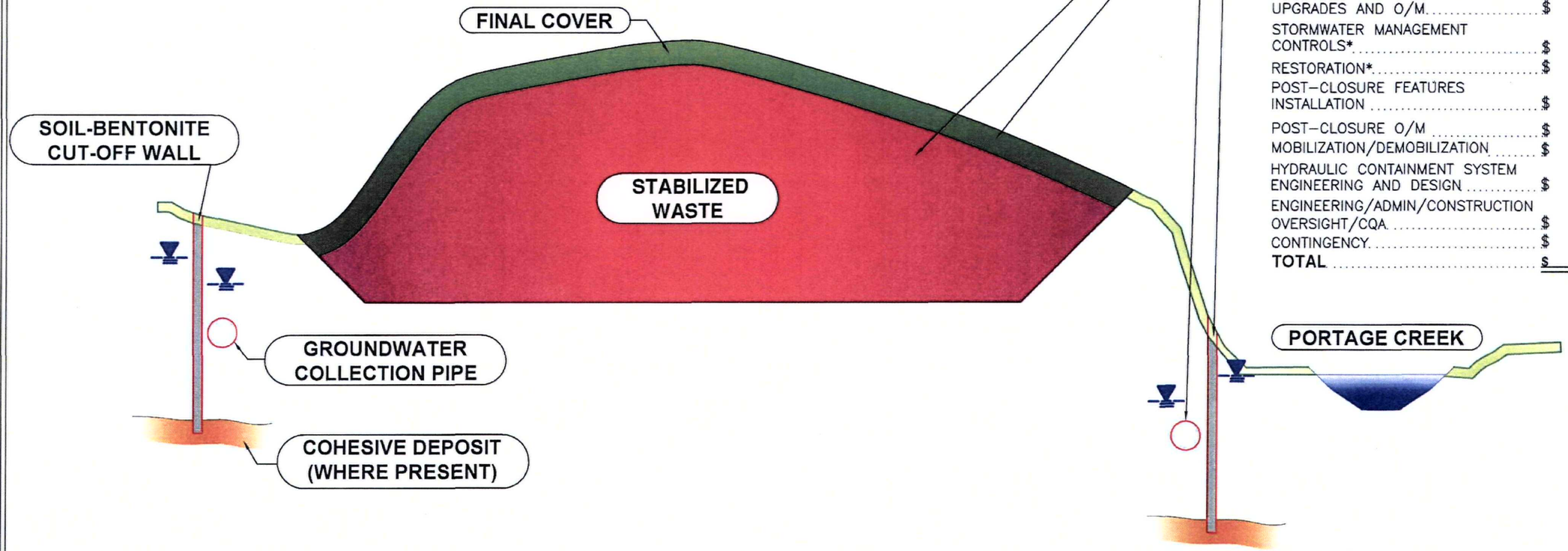
10. Assume 2' HDPE Cleanout (C.O.) installed in line. Make connections to transfer/collection line. Cost based on past experience.

11. Assume Directionally Drill for 6" HDPE forcemain line. Assume Trench Excavation to make necessary connections. Supply and Install Cost. Cost based on past experience

12. Includes excavation/backfill for concrete MH installation, lift station MH/Pumps/Access, connections to Transfer/Collection pipe. Cost based on experience.
13. Present Value of 1 time upgrade($500K) and 30 years of O&M Cost ($75K/yr) @ 7% Discount Rate.

14. From Arcadis Option 3B, Draft Feasibility Study. Increased for Addl. Well Installation. Assume $15K for 20 addl. nested wells. 400' U/S & 200' D/S spacing around perimeter.
15. From Arcadis Option 3B, Draft Feasibility Study. Increased groundwater monitoring by a factor of 2 for increased Well Monitoring.
16. Assume 10% of construction features installation cost (not including Post Closure O&M). Cost % based on past experience.
17. Includes engineering, design, slurry wall alignment confirmation borings (90 @ 50ft deep). Cost based on past experience.
18. Assume 10% of construction features installation cost. Cost % based on past experience.
19. Assume 10% for all cost estimates. Cost % based on past experience.

ALLIED PAPER (OU-1) CLOSURE
STABILIZATION & CONTAINMENT SYSTEM OPTION



A TYPICAL CROSS-SECTION

COST ESTIMATE

ITEM	COST
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OFF-SITE WASTE CONSOLIDATION*	$ 3,334,000
WASTE STABILIZATION	$ 21,808,000
PART 115 FINAL COVER	$ 6,110,000
GROUNDWATER COLLECTION SYSTEM	$ 3,750,500
SOIL-BENTONITE CUT-OFF WALL	$ 2,700,000
GROUNDWATER TRANSFER SYSTEM	$ 625,000
GROUNDWATER TREATMENT SYSTEM UPGRADES AND O/M	$ 1,430,750
STORMWATER MANAGEMENT CONTROLS*	$ 1,257,000
RESTORATION*	$ 3,455,000
POST-CLOSURE FEATURES INSTALLATION	$ 1,104,000
POST-CLOSURE O/M	$ 7,500,000
MOBILIZATION/DEMOBILIZATION	$ 4,919,000
HYDRAULIC CONTAINMENT SYSTEM ENGINEERING AND DESIGN	$ 250,000
ENGINEERING/ADMIN/CONSTRUCTION OVERSIGHT/CQA	$ 6,161,000
CONTINGENCY	$ 6,802,000
TOTAL	**$ 74,830,000**

PREPARED BY:

The City of Kalamazoo

NTH Consultants, Ltd.
Infrastructure Engineering and Environmental Services

*: COST OBTAINED FROM DRAFT FEASIBILITY STUDY REPORT, PREPARED BY ARCADIS, DATED 10/29/09.

ALLIED PAPER (OU-1) CLOSURE
STABILIZATION & CONTAINMENT SYSTEM OPTION

LEGEND

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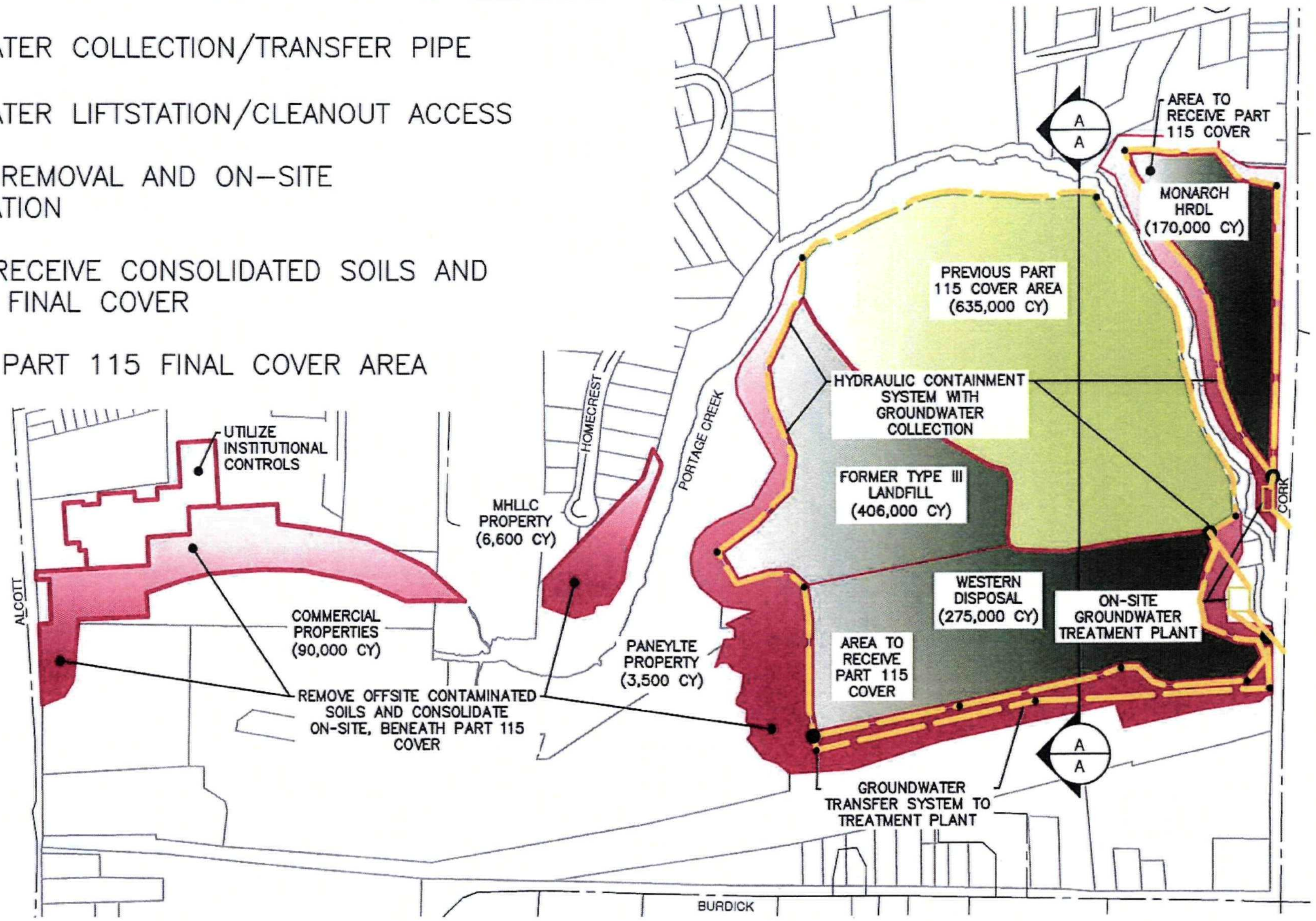

PLAN VIEW

N

0 100' 200'
SCALE

WASTE VOLUME TO BE STABILIZED

- MHLLC PROPERTY
- COMMERCIAL PROPERTIES
- PANEYLTE PROPERTY
- WESTERN DISPOSAL
- MONARCH HRDL

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VOLUMES OBTAINED FROM DRAFT FEASIBILITY STUDY PRESENTATION, SLIDE 14 PREPARED BY ARCADIS, DATED 09/14/09.